



INSIGHT ENGINEERING CO.

STORMWATER SITE PLAN

For
Clothier SP

Prepared for
City of Monroe
806 W. Main St.
Monroe, WA 98272
Ph: 360.863.4514

Project Site Location:
13813 Chain Lake Rd
Monroe WA, 98272-7700

Applicant/ Contact:
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Tax Id: 28073100201700
IECO Project: 17-0866

Certified Erosion and Sedimentation Control Lead:
To be named by contractor

Stormwater Site Plan Prepared By:
Jacob D. Mealey, P. E.

Stormwater Site Plan Preparation Date:
September 29, 2017
Approximate Construction Date:
May 1, 2018



9/29/17

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Acronyms and Abbreviations

BMP	Best Management Practices
DOE	Department of Ecology
EDDS	Engineering Design and Development Standards
ESC	Erosion and Sediment Control
IECO	Insight Engineering Company
MR	Minimum Requirement
SWPPP	Stormwater Pollution Prevention Plan
SWMMWW	Stormwater Management Manual for Western Washington
TESC	Temporary Erosion and Sediment Control
WWHM	Western Washington Hydrology Model

1.0 Executive Summary

The proposed project *Clothier SP* is located at 13813 Chain Lake Rd, Monroe, Washington. More generally, the site is located in Section 31, Township 28 North, and Range 7 East of the Willamette Meridian in Snohomish County, Washington. Please refer to the Vicinity Map attached later in the section. This report follows the City of Monroe's requirements and the requirements defined in DOE's 2012 SWMMWW as amended in 2014.

The site is currently developed with a house, a detached shop, a shed and a gravel driveways from Chain Lake Road. There exists some residential landscaping with many fully grown trees. The remaining site is covered with bushes and second growth forest. There is a 100-ft buffer and a delineated wetland exist in the lowland are of the site. This area will be set aside in a NGPA tract for conservation. The site contains one drainage basin that slopes moderately to the south east. Please refer to the downstream analysis map for more details. Per NRCS survey of Snohomish County, the project site contains Tokul soils and Terric Medisaprists soils that have a hydrologic classification of Type "C". Please refer to the soils map and descriptions attached later in this report for more details.

The proposal is to subdivide the property into seven single family residential lots with associated utilities. The existing house will remain on lot four. The access to the site will be from the Chain Lake Road. Per Figure 2.2, (flow chart for new development requirements) Volume I of the 2012 DOE, Minimum requirements #1 through #9 shall apply for this project. Refer to section 1.2 for Minimum Requirements Summary. For lots 1 through 6 the Flow Control (MR#7) and Onsite Stormwater Management (MR#5) requirements will be met by full dispersion. The proposed runoff is to flow to dispersion trench and naturally disperse in the natural vegetation. The area to be disturbed is 0.70 acres of which 0.28 acres (12,000 SF) are impervious. The total area is 3.14 acres. The effective impervious percentage is only 8.92- percent (0.28 acres) which is less than the threshold of 10- percent. The percentage site disturbance area is 22.29 percent (0.70 Acres) which leaves 77.71 % to remain undisturbed as native vegetation. Per Section 7.2.2 of the LID Manual and based on the effective imperious percentage of 9%, a minimum of 60%

shall remain undisturbed. Our proposal is to provide over 77.71 % to remain as native vegetation. Full dispersion is proposed for this subbasin. Runoff from the roof will be directed to dispersion trench to disperse in the natural vegetation to the maximum extent possible. For lots 1 through 6 water quality is exempt.

For lot 7 and the proposed access road, the Flow Control (MR#7) and Onsite Stormwater Management (MR#5) requirements will be met by full infiltration using pervious asphalt provided under the private road. The yard and roof drains will be connected towards the pervious pavement. An infiltration rate of 0.13-in/hr was used for the hydraulic calculations per the recommendations from the Geotech report attached under the Appendix A. For water quality supplementing the underlying soils with a soil that meets the water quality objective is proposed. The pervious asphalt requires a minimum value of 5meg/100g towards Cation Exchange capacity for water quality. The construction plans specify supplementing the underlying soils with a soil that meets the water quality objective. See "Permeable Asphalt Pavement" detail on construction plan sheet C3.0. Post-Construction Soil Quality and Depth BMP T.5.13 are proposed towards additional onsite stormwater management.

Figure 1 - Minimum Requirements (MR's) for New Development Projects

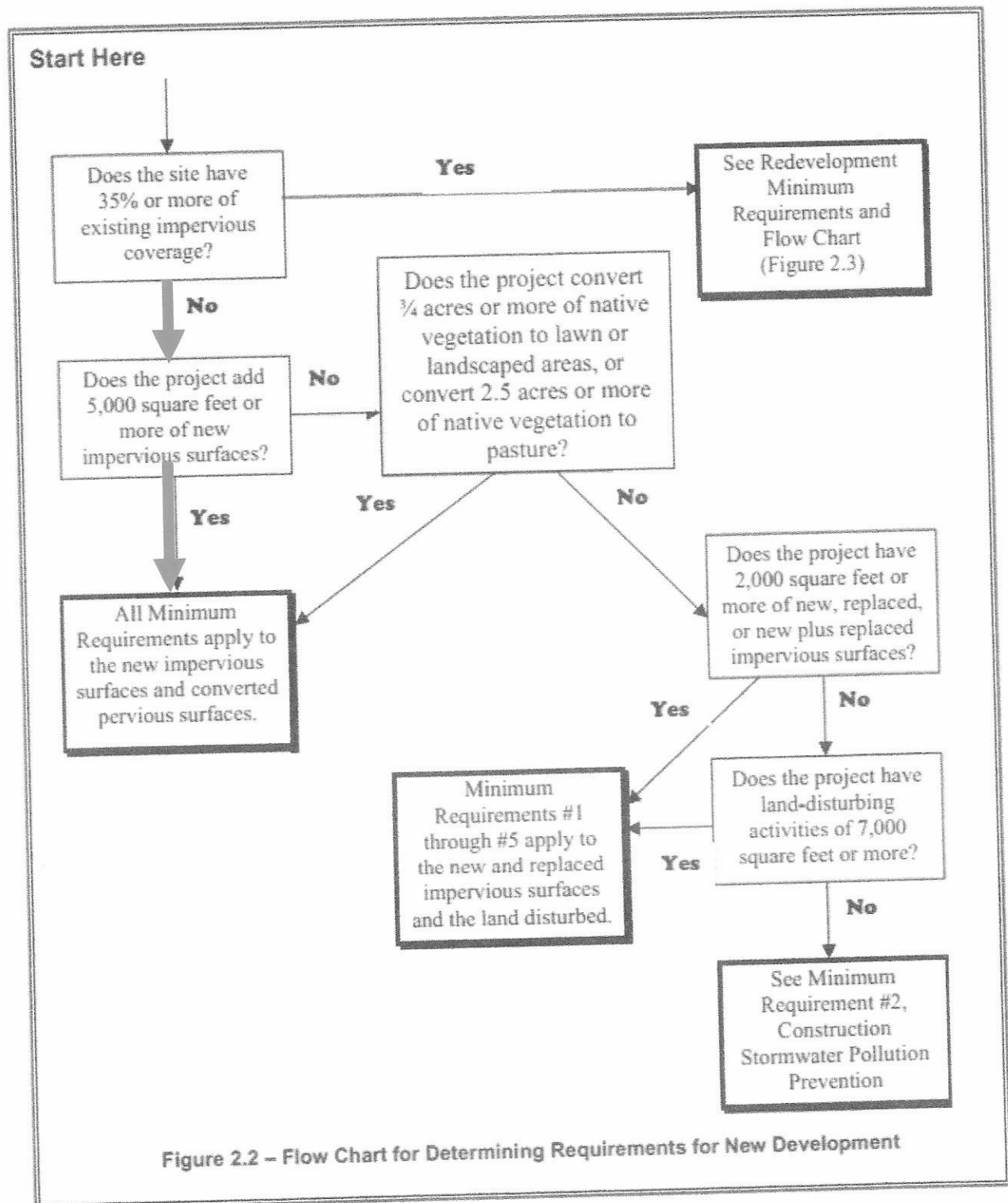
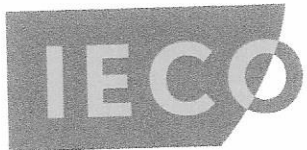


FIGURE 2. VICINITY MAP



TAKEN FROM THE SNAZZY MAPS



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Figure 2 -Vicinity Map
Clothier SP
Monroe, Washington

SCALE:
NTS

DATE: 9/29/17

JOB #: 17-0825

BY: JDM

FILE NAME:
17-0825/doc/Stormwater Site Plan

1.1 Minimum Requirements Summary

MR : Minimum Requirement

SWPPP : Stormwater Pollution Prevention Plan

MR #1 Stormwater Site Plan Narrative: The Stormwater Site Plan preparation follows the City of Mountlake Terrace's requirements and in accordance with DOE's 2012 SWMMWW. Refer to the executive summary within Section 1.0 .

MR #2 SWPPP Narrative: A SWPPP shall be provided for the construction submittal.

MR #3 Water Pollution Source Control for New Development: No source control pollutants pertains to the proposed project, therefore no BMP's are required.

MR #4 Preservation of Natural Drainage Systems and Outfalls: For lots 1 through 6 the developed site drainage will continue to follow its natural drainage path. For lot 7 and the proposed access road, the previous asphalt allows the runoff to be directly infiltrated into ground. Therefore no drainage is anticipated to leave the site.

MR #5 Onsite Stormwater Management: For lots 1 through 6 full dispersion is proposed. For lot 7 and the proposed access road, the yard and roof drains will be connected towards the pervious pavement. Post-Construction Soil Quality and Depth BMP T.5.13 are proposed towards additional onsite stormwater management.

MR #6 Runoff Treatment: For lots 1 through 6 water quality is exempt. For lot 7 and the proposed access road, the water quality requirement will be obtained by supplementing the underlying soils with a soil that meets the water quality objective. The pervious asphalt requires a minimum value of 5meg/100g towards Cation Exchange capacity for water quality. The construction plans specify supplementing the underlying soils with a soil that meets the water quality objective.

MR #7 Flow Control: For lots 1 through 6 full dispersion is proposed. For lot 7 and the proposed access road, the Flow Control (MR#7) and Onsite Stormwater Management (MR#5) requirements will be met by full infiltration using pervious asphalt provided under the private road. The yard and roof drains will be connected towards the pervious pavement.

MR #8 Wetlands Protection: There are no wetlands located within the site.

MR #9 Operations and Maintenance: An Operations and Maintenance Manual shall be provided for the Construction submittal.

2.0 Existing Conditions

The proposed project *Clothier SP* is located at 13813 Chain Lake Rd, Monroe, Washington. More generally, the site is located in Section 31, Township 28 North, and Range 7 East of the Willamette Meridian in Snohomish County, Washington.

The site is currently developed with a house, a detached shop, a shed and a gravel driveways from Chain Lake Road. There exists some residential landscaping with many fully grown trees. The remaining site is covered with bushes and second growth forest. There is a 100-ft buffer and a delineated wetland exist in the lowland are of the site. This area will be set aside in a NGPA tract for conservation. The site contains one drainage basin that slopes moderately to the south east. Please refer to the downstream analysis map for more details. Per NRCS survey of Snohomish County, the project site contains Tokul soils and Terric Medisaprists soils that have a hydrologic classification of Type "C". Please refer to the soils map and descriptions attached later in this report for more details.

FIGURE 3. SOIL MAP



SOILS LEGEND

69-Terric Medisapristis, nearly level

72-Tokul gravelly medial loam, 0 to 8 percent slopes



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Figure 3 - Soil Map
Clothier SP
Monroe, Washington

SCALE:
NONE

DATE: 9/29/17

JOB #: 17-0825

BY: JDM

FILE NAME:
17-0825/doc/Stormwater Site Plan

Snohomish County Area, Washington

69—Terric Medisaprists, nearly level

Map Unit Setting

- National map unit symbol: 2hzz
- Elevation: 0 to 1,150 feet
- Mean annual precipitation: 35 to 70 inches
- Mean annual air temperature: 50 degrees F
- Frost-free period: 170 days
- Farmland classification: Prime farmland if drained

Map Unit Composition

- Terric medisaprists and similar soils: 85 percent
- Minor components: 9 percent
- Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Terric Medisaprists

Setting

- Landform: Depressions, flood plains, till plains
- Parent material: Organic material over alluvium

Typical profile

- H1 - 0 to 28 inches: muck
- H2 - 28 to 60 inches: sandy loam

Properties and qualities

- Slope: 0 to 3 percent
- Depth to restrictive feature: More than 80 inches
- Natural drainage class: Very poorly drained
- Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
- Depth to water table: About 12 to 36 inches
- Frequency of flooding: None
- Frequency of ponding: None
- Available water storage in profile: Very high (about 16.7 inches)

Interpretive groups

- Land capability classification (irrigated): None specified
- Land capability classification (nonirrigated): 3w
- Hydrologic Soil Group: C
- Hydric soil rating: Yes

Minor Components

Snohomish

- Percent of map unit: 3 percent
- Landform: Flood plains
- Hydric soil rating: Yes

Mukilteo

- Percent of map unit: 3 percent
- Landform: Depressions
- Hydric soil rating: Yes

Orcas

- Percent of map unit: 3 percent
- Landform: Depressions
- Hydric soil rating: Yes

Snohomish County Area, Washington

72—Tokul gravelly medial loam, 0 to 8 percent slopes

Map Unit Setting

- National map unit symbol: 2t61k
- Elevation: 160 to 1,150 feet
- Mean annual precipitation: 45 to 70 inches
- Mean annual air temperature: 46 to 52 degrees F
- Frost-free period: 140 to 200 days
- Farmland classification: All areas are prime farmland

Map Unit Composition

- Tokul and similar soils: 85 percent
- Minor components: 15 percent
- Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tokul

Setting

- Landform: Till plains, hillslopes
- Landform position (two-dimensional): Toeslope
- Landform position (three-dimensional): Side slope, tread
- Down-slope shape: Convex
- Across-slope shape: Convex
- Parent material: Volcanic ash mixed with loess over glacial till

Typical profile

- Oi - 0 to 1 inches: slightly decomposed plant material

- Oa - 1 to 2 inches: highly decomposed plant material
- A - 2 to 6 inches: gravelly medial loam
- Bs1 - 6 to 9 inches: gravelly medial loam
- Bs2 - 9 to 17 inches: gravelly medial loam
- Bs3 - 17 to 24 inches: gravelly medial loam
- BC - 24 to 33 inches: gravelly medial fine sandy loam
- 2Bsm - 33 to 62 inches: cemented material

Properties and qualities

- Slope: 0 to 8 percent
- Depth to restrictive feature: 20 to 39 inches to cemented horizon; 20 to 39 inches to densic material
- Natural drainage class: Moderately well drained
- Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
- Depth to water table: About 18 to 36 inches
- Frequency of flooding: None
- Frequency of ponding: None
- Available water storage in profile: Moderate (about 8.7 inches)

Interpretive groups

- Land capability classification (irrigated): None specified
- Land capability classification (nonirrigated): 3s
- Hydrologic Soil Group: B
- Other vegetative classification: Limited Depth Soils (G002XN302WA), Limited Depth Soils (G002XF303WA)
- Hydric soil rating: No

Minor Components

Pastik

- Percent of map unit: 5 percent
- Landform: Terraces
- Landform position (three-dimensional): Tread
- Down-slope shape: Linear
- Across-slope shape: Linear
- Hydric soil rating: No

Barneston

- Percent of map unit: 5 percent
- Landform: Eskers, kames, moraines
- Landform position (two-dimensional): Summit, shoulder
- Landform position (three-dimensional): Interfluvium, crest
- Down-slope shape: Convex
- Across-slope shape: Convex
- Hydric soil rating: No

Norma

- Percent of map unit: 3 percent
- Landform: Depressions, drainageways
- Landform position (three-dimensional): Dip
- Down-slope shape: Concave, linear
- Across-slope shape: Concave
- Hydric soil rating: Yes

Mckenna

- Percent of map unit: 2 percent
- Landform: Depressions, drainageways
- Landform position (three-dimensional): Dip
- Down-slope shape: Concave, linear
- Across-slope shape: Concave
- Hydric soil rating: Yes

3.0 Offsite Analysis

A site reconnaissance was performed by Brian Kalab of Insight engineering on September 8, 2017 to verify the downstream flow paths and observe any drainage problems downstream of the site. The sky was cloudy. It was overcast with a temperature of 72 degrees.

The site is currently developed with a house, a detached shop, a shed and a gravel driveways from Chain Lake Road. There exists some residential landscaping with many fully grown trees. The remaining site is covered with bushes and second growth forest. There is a 100-ft buffer and a delineated wetland exist in the lowland are of the site. This area will be set aside in a NGPA tract for conservation. The site contains one drainage basin that slopes moderately to the south east. No visible on-site drainage problems were observed at the time of field investigations.

3.1 Upstream Analysis

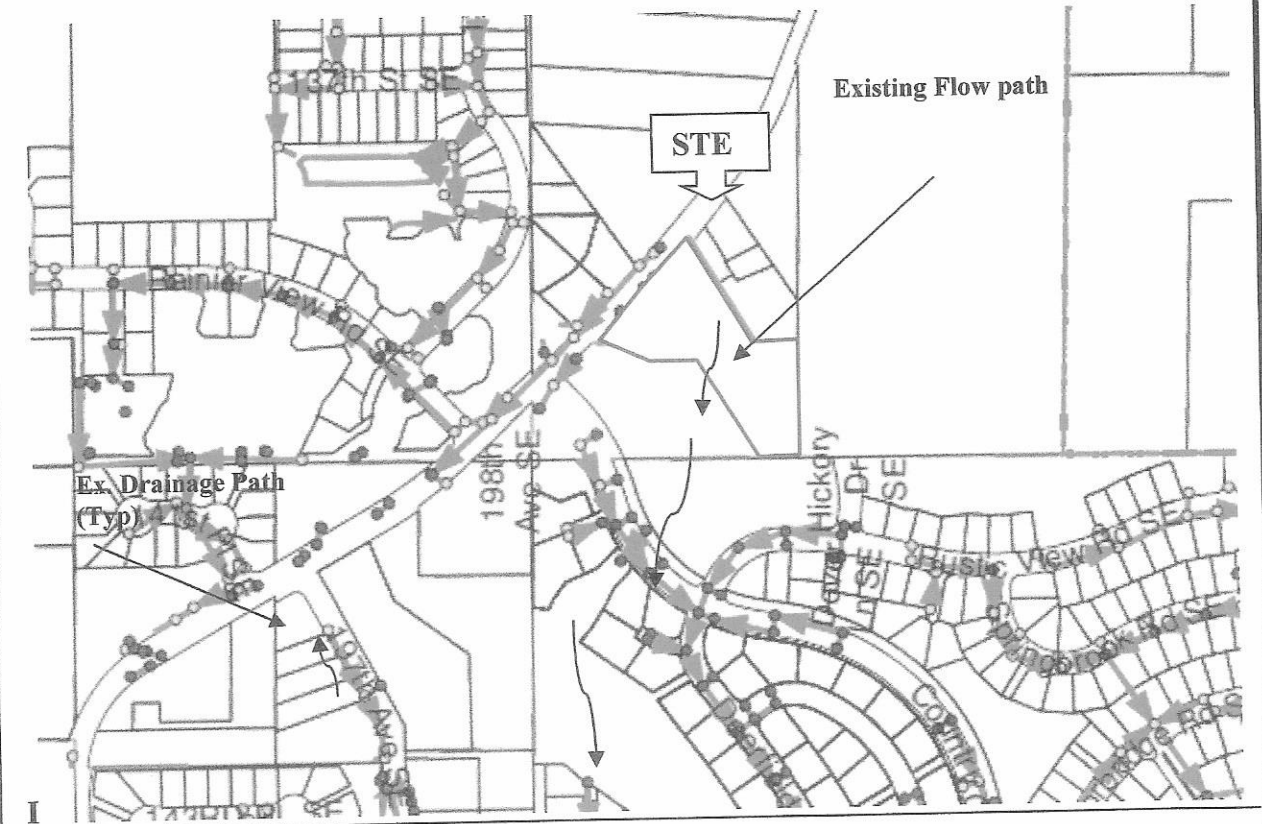
Based on the site reconnaissance and the topographic survey of the site, all upstream existing flows will continue to flow unrestricted through the site. Refer to the Downstream Analysis Map attached in the next page for more details.

3.2 Downstream Analysis

Refer to the Downstream Analysis Maps attached to the next page for a visual description of the downstream flow. The site contains one drainage basin that slopes to the southeast. The runoff flows south and enters the existing drainage system along the Country Crescent Blvd through a catch basin. The 24-in drainage system crosses Country Crescent Blvd and outlets to a highly vegetated area. After travelling south for about 600-ft the drainage enters the existing 24-in pipe drainage system along Autumn's Ave SE. It continues south along Autumns Ave SE for about 1000-ft. The drainage turns west and continues along an internal road to go to an Infiltration pond facility. From there the flow enters the existing drainage system that goes west towards Ravenwood Rd SE. It travels south along Ravenwood Rd SE for about 200-ft and turns east along Ambers Pl SE for about 260-ft. The flow goes south for about 480-ft and then enters the

Wood Creek Road. The flow continues south along Woods Creek Road up to 1-mile. The downstream analysis was concluded at this point. No existing problems were observed, and no potential problems could be deduced at the time of the site visit. This proposal will not adversely affect the downstream as it is very minimal.

FIGURE 4. DOWNSTREAM ANALYSIS MAP-1



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Figure 4 - Downstream Analysis Map-1

Clothier SP
Monroe, Washington

SCALE:
NONE

DATE: 9/29/17

JOB #: 17-0825

BY: JDM

FILE NAME:
17-0825/doc/Stormwater Site Plan

FIGURE 5. DOWNSTREAM ANALYSIS MAP-2



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Figure 5 - Downstream Analysis Map-2

Clothier SP
Monroe, Washington

SCALE: NONE	DATE: 9/29/17	JOB #: 17-0825
BY: JDM	FILE NAME: 17-0825/doc/Stormwater Site Plan	

4.0 Developed Conditions

The proposed project ***Clothier SP*** is located at 13813 Chain Lake Rd, Monroe, Washington. More generally, the site is located in Section 31, Township 28 North, and Range 7 East of the Willamette Meridian in Snohomish County, Washington. Per NRCS survey of Snohomish County, the project site contains Tokul soils and Terric Medisaprists soils that have a hydrologic classification of Type "C".

The proposal is to subdivide the property into seven single family residential lots with associated utilities. The existing house will remain on lot four. The access to the site will be from the Chain Lake Road. Per Figure 2.2, (flow chart for new development requirements) Volume I of the 2012 DOE, Minimum requirements #1 through #9 shall apply for this project. Refer to section 1.2 for Minimum Requirements Summary. For lots 1 through 6 the Flow Control (MR#7) and Onsite Stormwater Management (MR#5) requirements will be met by full dispersion. The proposed runoff is to flow to dispersion trench and naturally disperse in the natural vegetation. The area to be disturbed is 0.70 acres of which 0.28 acres (12,000 SF) are impervious. The total area is 3.14 acres. The effective impervious percentage is only 8.92- percent (0.28 acres) which is less than the threshold of 10- percent. The percentage site disturbance area is 22.29 percent (0.70 Acres) which leaves 77.71 % to remain undisturbed as native vegetation. Per Section 7.2.2 of the LID Manual and based on the effective imperious percentage of 9%, a minimum of 60% shall remain undisturbed. Our proposal is to provide over 77.71 % to remain as native vegetation. Full dispersion is proposed for this subbasin. Runoff from the roof will be directed to dispersion trench to disperse in the natural vegetation to the maximum extent possible. For lots 1 through 6 water quality is exempt.

For lot 7 and the proposed access road, the Flow Control (MR#7) and Onsite Stormwater Management (MR#5) requirements will be met by full infiltration using pervious asphalt provided under the private road. The yard and roof drains will be connected towards the pervious pavement. An infiltration rate of 0.13-in/hr was used for the hydraulic calculations per the recommendations from the Geotech report attached under the Appendix A. For water quality

supplementing the underlying soils with a soil that meets the water quality objective is proposed. The pervious asphalt requires a minimum value of 5meg/100g towards Cation Exchange capacity for water quality. The construction plans specify supplementing the underlying soils with a soil that meets the water quality objective. See "Permeable Asphalt Pavement" detail on construction plan sheet C3.0. Post-Construction Soil Quality and Depth BMP T.5.13 are proposed towards additional onsite stormwater management.

5.0 Site Hydraulic Conditions

Existing Site Area	= 3.63 Acres
<u>Site area after dedication</u>	<u>= 3.49 Acres</u>
<i>Total study Area</i>	<i>= 3.49 Acres</i>

Per NRCS survey of Snohomish County, the project site contains Tokul soils and Terric Medisaprists soils that have a hydrologic classification of Type "C".

5.1 Existing Basin Summary

EX-1

EX-1 includes the area allotted to Lots 1 through 6.

EX-1 Total Area = 3.14 Acres

Refer to the Existing Basin Map for more details.

EX-2

EX-2 includes the area allotted to Lot 7, the proposed access road and the pervious area surrounding it.

EX-2 Total Area = 0.35 Acres

<u>Impervious Area footprint*</u>	<u>= 0.18 Acres</u>
<i>Area Included in the WWHM Analysis (EX-2 WWHM)</i>	<i>= 0.18 Acres</i>

Therefore,

**The area included in the WWHM analysis (EX-2 WWHM) will be the area where the new impervious is proposed. The pervious area will infiltrate into the underlying soils.*

Refer to the Existing Basin Map and the following pages for more details.

5.2 Developed Basin Summary

DV-1

DV-1 includes the area allotted to Lots 1 through 6.

DV-1 Total Area = 3.14 Acres

Developed Impervious Areas:

Lot Impervious*	= 0.28 Acres (10,000 SF)
Existing Roof	= 0.04 Acres (1,665 SF)
<u>Existing Driveways</u>	<u>= 0.01 Acres (439 SF)</u>
Total Site Impervious	= 0.28 Acres (12,104 SF)

**For Lot Impervious 2,000 SF impervious area was assumed for each lot.*

Developed Pervious Areas:

Site Pervious:

Pervious Area (Lawn)=3.14 Acres – 0.28 Acres=2.86 Acres

Effective impervious percentage = $0.28 / 3.14 = 8.92 \% < 10\%$. Therefore OK, per BMP T5.30 of 2014 SWMMWW

Area of Disturbance = 0.60 Acres

Percentage of Disturbance Area = $0.70 / 3.04 = 22.29 \%$

Undisturbed Area = $3.14 - 0.70 = 2.44$ Acres

Percentage of Undisturbed Area = $2.44 / 3.14 = 77.71 \%$

Per Section 7.2.2 of the LID Manual and based on the percentage impervious area of 9 %, approximately 60 % of the upland portion of the site shall be kept as native vegetation. This percentage is less than the provided of 77.71 %.

Therefore full dispersion is proposed here.

Refer to the Developed Basin Map and the following pages for more details.

DV-2

DV-2 includes the area allotted to Lot 7, the proposed access road and the pervious area surrounding it.

DV-2 Total Area = 0.35 Acres

<u>Impervious Area footprint*</u>	<u>= 0.18 Acres</u>
<i>Area Included in the WWHM Analysis(DV-2 WWHM)</i>	<i>= 0.18 Acres</i>

Developed Impervious Areas:

Lot Impervious	= 0.04 Acres (2,000 SF)
Road	= 0.11 Acres (4,729 SF)
<u>Sidewalk</u>	<u>= 0.03 Acres (1,126 SF)</u>
Total Impervious	= 0.18 Acres (7,855 SF)

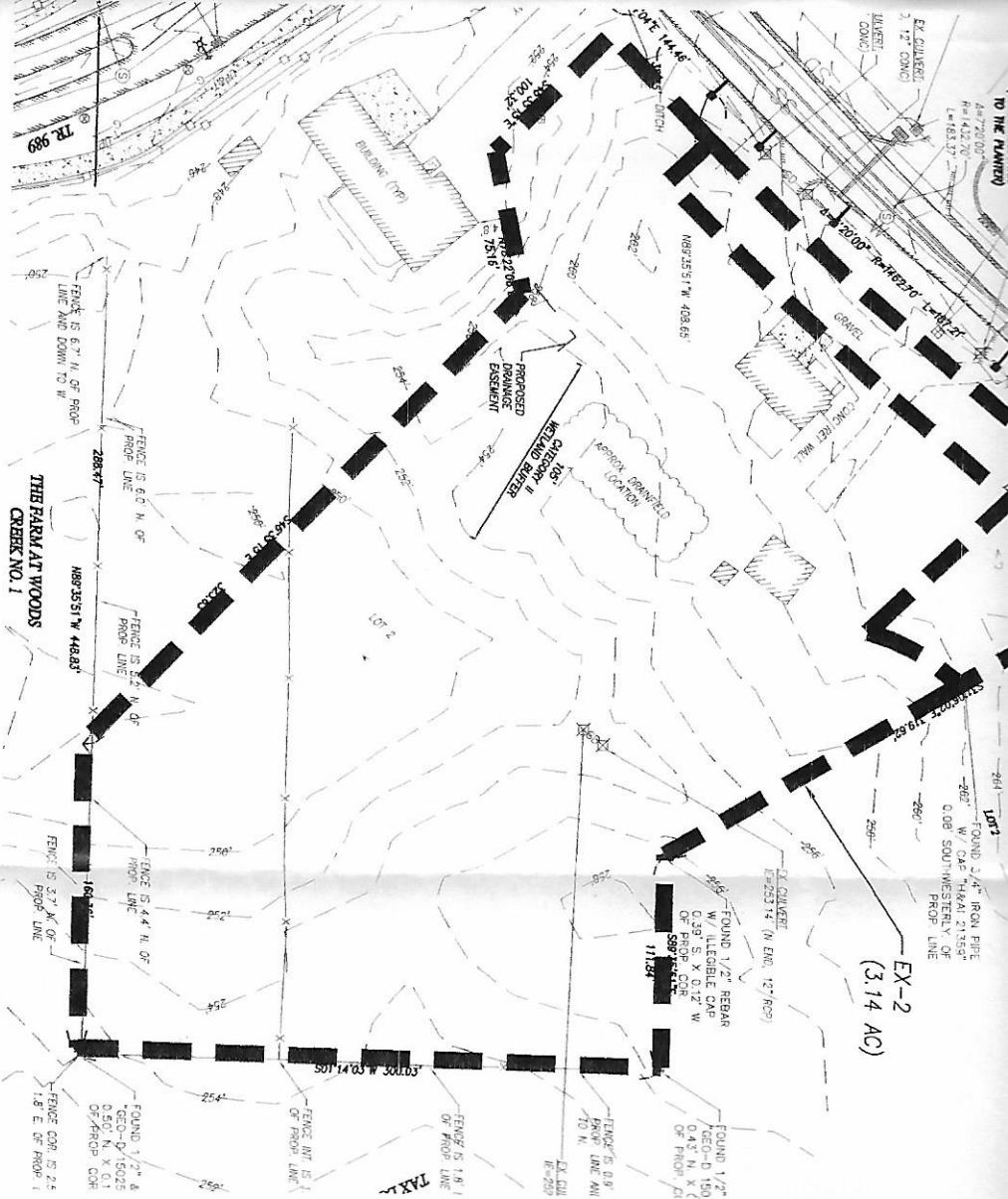
Developed Pervious Areas:

Site Pervious:

Pervious Area (Lawn) = 0.35 Acres – 0.18 Acres = 0.17 Acres

The impervious areas will be directed to pervious asphalt as shown on the plans. Pervious area will be dispersed into the lawn areas and infiltrated.

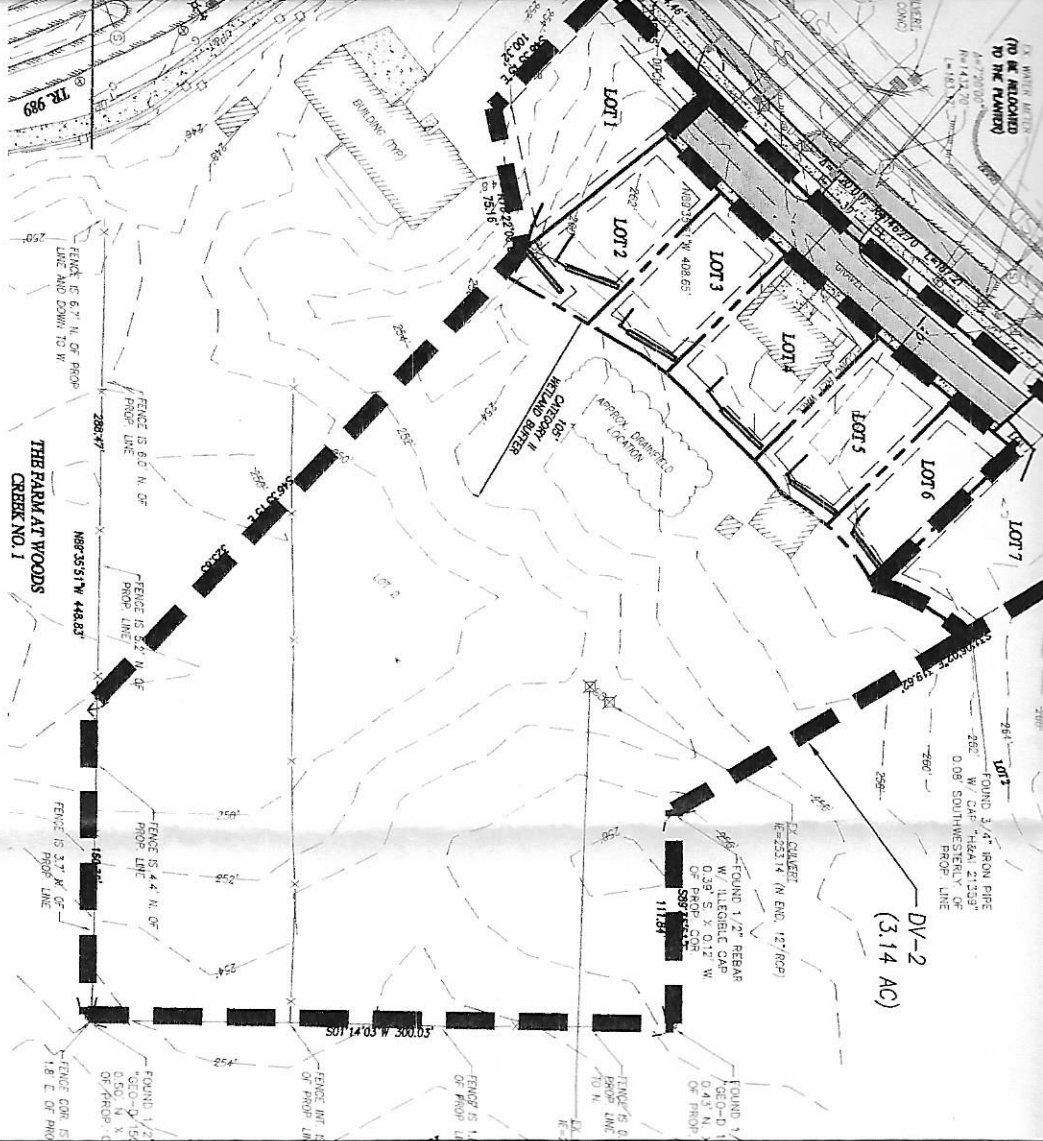
Refer to the Developed Basin Map and the following pages for more details.



SCALE: 1" = 100'

0 50 100

EXISTING BASIN MAP



SCALE: 1" = 100'



DEVELOPED BASIN MAP

WWHM2012
PROJECT REPORT

Project Name: Clothier
Site Name: Clothier SP
Site Address: 13813 Chain Lake Road
City : Monroe, WA
Report Date: 9/29/2017
Gage : Everett
Data Start : 1948/10/01
Data End : 2009/09/30
(adjusted) Precip Scale: 0.00
Version Date: 2016/02/25
Version : 4.2.12

Low Flow Threshold for POC 1 : 50 Percent of the 2 Year

High Flow Threshold for POC 1: 50 year

PREDEVELOPED LAND USE

Name : Ex-2 WWHM
Bypass: No

GroundWater: No

<u>Pervious Land Use</u>	<u>acre</u>
C, Forest, Flat	.18

Pervious Total	0.18
----------------	------

<u>Impervious Land Use</u>	<u>acre</u>
Impervious Total	0

Basin Total	0.18
-------------	------

Element Flows To:

Surface	Interflow	Groundwater
---------	-----------	-------------

MITIGATED LAND USE

Name : Permeable Pavement
Pavement Area: 0.1084 ft.
Pavement Length: 236.00 ft.

Pavement Width: 20.00 ft.
 Pavement slope 1: 0 To 1
 Pavement thickness: 0.33
 Pour Space of Pavement: 0.3
 Material thickness of second layer: 1
 Pour Space of material for second layer: 0.4
 Material thickness of third layer: 0
 Pour Space of material for third layer: 0
 Infiltration On
 Infiltration rate: 0.13
 Infiltration safety factor: 1
 Wetted surface area On
 Total Volume Infiltrated (ac-ft.): 32.809
 Total Volume Through Riser (ac-ft.): 0
 Total Volume Through Facility (ac-ft.): 32.809
 Percent Infiltrated: 100
 Total Precip Applied to Facility: 0
 Total Evap From Facility: 1.755

Element Flows To:

Outlet 1 Outlet 2

Permeable Pavement Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.108	0.000	0.000	0.000
0.0148	0.108	0.000	0.000	0.014
0.0296	0.108	0.001	0.000	0.014
0.0443	0.108	0.001	0.000	0.014
0.0591	0.108	0.002	0.000	0.014
0.0739	0.108	0.003	0.000	0.014
0.0887	0.108	0.003	0.000	0.014
0.1034	0.108	0.004	0.000	0.014
0.1182	0.108	0.005	0.000	0.014
0.1330	0.108	0.005	0.000	0.014
0.1478	0.108	0.006	0.000	0.014
0.1626	0.108	0.007	0.000	0.014
0.1773	0.108	0.007	0.000	0.014
0.1921	0.108	0.008	0.000	0.014
0.2069	0.108	0.009	0.000	0.014
0.2217	0.108	0.009	0.000	0.014
0.2364	0.108	0.010	0.000	0.014
0.2512	0.108	0.010	0.000	0.014
0.2660	0.108	0.011	0.000	0.014
0.2808	0.108	0.012	0.000	0.014
0.2956	0.108	0.012	0.000	0.014
0.3103	0.108	0.013	0.000	0.014
0.3251	0.108	0.014	0.000	0.014
0.3399	0.108	0.014	0.000	0.014
0.3547	0.108	0.015	0.000	0.014
0.3694	0.108	0.016	0.000	0.014
0.3842	0.108	0.016	0.000	0.014

0.3990	0.108	0.017	0.000	0.014
0.4138	0.108	0.017	0.000	0.014
0.4286	0.108	0.018	0.000	0.014
0.4433	0.108	0.019	0.000	0.014
0.4581	0.108	0.019	0.000	0.014
0.4729	0.108	0.020	0.000	0.014
0.4877	0.108	0.021	0.000	0.014
0.5024	0.108	0.021	0.000	0.014
0.5172	0.108	0.022	0.000	0.014
0.5320	0.108	0.023	0.000	0.014
0.5468	0.108	0.023	0.000	0.014
0.5616	0.108	0.024	0.000	0.014
0.5763	0.108	0.025	0.000	0.014
0.5911	0.108	0.025	0.000	0.014
0.6059	0.108	0.026	0.000	0.014
0.6207	0.108	0.026	0.000	0.014
0.6354	0.108	0.027	0.000	0.014
0.6502	0.108	0.028	0.000	0.014
0.6650	0.108	0.028	0.000	0.014
0.6798	0.108	0.029	0.000	0.014
0.6946	0.108	0.030	0.000	0.014
0.7093	0.108	0.030	0.000	0.014
0.7241	0.108	0.031	0.000	0.014
0.7389	0.108	0.032	0.000	0.014
0.7537	0.108	0.032	0.000	0.014
0.7684	0.108	0.033	0.000	0.014
0.7832	0.108	0.033	0.000	0.014
0.7980	0.108	0.034	0.000	0.014
0.8128	0.108	0.035	0.000	0.014
0.8276	0.108	0.035	0.000	0.014
0.8423	0.108	0.036	0.000	0.014
0.8571	0.108	0.037	0.000	0.014
0.8719	0.108	0.037	0.000	0.014
0.8867	0.108	0.038	0.000	0.014
0.9014	0.108	0.039	0.000	0.014
0.9162	0.108	0.039	0.000	0.014
0.9310	0.108	0.040	0.000	0.014
0.9458	0.108	0.041	0.000	0.014
0.9606	0.108	0.041	0.000	0.014
0.9753	0.108	0.042	0.000	0.014
0.9901	0.108	0.042	0.000	0.014
1.0049	0.108	0.043	0.000	0.014
1.0197	0.108	0.043	0.000	0.014
1.0344	0.108	0.044	0.000	0.014
1.0492	0.108	0.044	0.000	0.014
1.0640	0.108	0.045	0.000	0.014
1.0788	0.108	0.045	0.000	0.014
1.0936	0.108	0.046	0.000	0.014
1.1083	0.108	0.046	0.000	0.014
1.1231	0.108	0.047	0.000	0.014
1.1379	0.108	0.047	0.000	0.014
1.1527	0.108	0.048	0.000	0.014
1.1674	0.108	0.048	0.000	0.014
1.1822	0.108	0.049	0.000	0.014
1.1970	0.108	0.049	0.000	0.014

Flow Frequency Return Periods for Predeveloped. POC #1

<u>Return Period</u>	<u>Flow(cfs)</u>
2 year	0.006048
5 year	0.009278
10 year	0.011769
25 year	0.015333
50 year	0.018301
100 year	0.021547

Flow Frequency Return Periods for Mitigated. POC #1

<u>Return Period</u>	<u>Flow(cfs)</u>
2 year	0
5 year	0
10 year	0
25 year	0
50 year	0
100 year	0

Stream Protection Duration

Annual Peaks for Predeveloped and Mitigated. POC #1

<u>Year</u>	<u>Predeveloped</u>	<u>Mitigated</u>
1949	0.006	0.000
1950	0.006	0.000
1951	0.006	0.000
1952	0.004	0.000
1953	0.004	0.000
1954	0.020	0.000
1955	0.008	0.000
1956	0.007	0.000
1957	0.009	0.000
1958	0.006	0.000
1959	0.006	0.000
1960	0.006	0.000
1961	0.011	0.000
1962	0.005	0.000
1963	0.009	0.000
1964	0.006	0.000
1965	0.005	0.000
1966	0.003	0.000
1967	0.006	0.000
1968	0.008	0.000
1969	0.018	0.000
1970	0.004	0.000
1971	0.007	0.000
1972	0.005	0.000
1973	0.005	0.000
1974	0.010	0.000
1975	0.004	0.000
1976	0.004	0.000
1977	0.004	0.000
1978	0.004	0.000
1979	0.012	0.000
1980	0.006	0.000
1981	0.004	0.000

1982	0.006	0.000
1983	0.010	0.000
1984	0.006	0.000
1985	0.007	0.000
1986	0.017	0.000
1987	0.008	0.000
1988	0.004	0.000
1989	0.004	0.000
1990	0.006	0.000
1991	0.006	0.000
1992	0.004	0.000
1993	0.004	0.000
1994	0.004	0.000
1995	0.006	0.000
1996	0.010	0.000
1997	0.020	0.000
1998	0.004	0.000
1999	0.005	0.000
2000	0.004	0.000
2001	0.001	0.000
2002	0.005	0.000
2003	0.004	0.000
2004	0.007	0.000
2005	0.005	0.000
2006	0.013	0.000
2007	0.011	0.000
2008	0.015	0.000
2009	0.005	0.000

Stream Protection Duration

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.0200	0.0000
2	0.0198	0.0000
3	0.0184	0.0000
4	0.0169	0.0000
5	0.0149	0.0000
6	0.0134	0.0000
7	0.0121	0.0000
8	0.0107	0.0000
9	0.0106	0.0000
10	0.0104	0.0000
11	0.0101	0.0000
12	0.0098	0.0000
13	0.0087	0.0000
14	0.0085	0.0000
15	0.0081	0.0000
16	0.0078	0.0000
17	0.0076	0.0000
18	0.0072	0.0000
19	0.0072	0.0000
20	0.0069	0.0000
21	0.0069	0.0000
22	0.0063	0.0000

0.0041	7075	0	0	Pass
0.0043	6128	0	0	Pass
0.0044	5311	0	0	Pass
0.0046	4654	0	0	Pass
0.0047	4066	0	0	Pass
0.0049	3548	0	0	Pass
0.0050	3136	0	0	Pass
0.0052	2759	0	0	Pass
0.0053	2447	0	0	Pass
0.0055	2145	0	0	Pass
0.0056	1892	0	0	Pass
0.0058	1656	0	0	Pass
0.0060	1508	0	0	Pass
0.0061	1370	0	0	Pass
0.0063	1250	0	0	Pass
0.0064	1154	0	0	Pass
0.0066	1069	0	0	Pass
0.0067	1009	0	0	Pass
0.0069	950	0	0	Pass
0.0070	888	0	0	Pass
0.0072	825	0	0	Pass
0.0073	777	0	0	Pass
0.0075	733	0	0	Pass
0.0077	686	0	0	Pass
0.0078	648	0	0	Pass
0.0080	622	0	0	Pass
0.0081	602	0	0	Pass
0.0083	583	0	0	Pass
0.0084	561	0	0	Pass
0.0086	538	0	0	Pass
0.0087	506	0	0	Pass
0.0089	487	0	0	Pass
0.0090	473	0	0	Pass
0.0092	457	0	0	Pass
0.0094	440	0	0	Pass
0.0095	424	0	0	Pass
0.0097	408	0	0	Pass
0.0098	394	0	0	Pass
0.0100	380	0	0	Pass
0.0101	368	0	0	Pass
0.0103	353	0	0	Pass
0.0104	341	0	0	Pass
0.0106	333	0	0	Pass
0.0107	322	0	0	Pass
0.0109	313	0	0	Pass
0.0110	304	0	0	Pass
0.0112	293	0	0	Pass
0.0114	284	0	0	Pass
0.0115	276	0	0	Pass
0.0117	266	0	0	Pass
0.0118	257	0	0	Pass
0.0120	242	0	0	Pass
0.0121	234	0	0	Pass
0.0123	226	0	0	Pass
0.0124	212	0	0	Pass

0.0126	205	0	0	Pass
0.0127	195	0	0	Pass
0.0129	187	0	0	Pass
0.0131	177	0	0	Pass
0.0132	166	0	0	Pass
0.0134	160	0	0	Pass
0.0135	151	0	0	Pass
0.0137	146	0	0	Pass
0.0138	135	0	0	Pass
0.0140	128	0	0	Pass
0.0141	120	0	0	Pass
0.0143	111	0	0	Pass
0.0144	99	0	0	Pass
0.0146	86	0	0	Pass
0.0148	75	0	0	Pass
0.0149	63	0	0	Pass
0.0151	59	0	0	Pass
0.0152	56	0	0	Pass
0.0154	50	0	0	Pass
0.0155	42	0	0	Pass
0.0157	40	0	0	Pass
0.0158	37	0	0	Pass
0.0160	36	0	0	Pass
0.0161	30	0	0	Pass
0.0163	28	0	0	Pass
0.0164	26	0	0	Pass
0.0166	20	0	0	Pass
0.0168	16	0	0	Pass
0.0169	13	0	0	Pass
0.0171	8	0	0	Pass
0.0172	6	0	0	Pass
0.0174	5	0	0	Pass
0.0175	4	0	0	Pass
0.0177	4	0	0	Pass
0.0178	3	0	0	Pass
0.0180	3	0	0	Pass
0.0181	3	0	0	Pass
0.0183	3	0	0	Pass

Water Quality BMP Flow and Volume for POC #1
 On-line facility volume: 0 acre-feet
 On-line facility target flow: 0 cfs.
 Adjusted for 15 min: 0 cfs.
 Off-line facility target flow: 0 cfs.
 Adjusted for 15 min: 0 cfs.

LID Report

LID Technique	Water Quality	Used for	Total Volumn	Volumn	Infiltration	Cumulative
Percent		Percent	Comment	Through	Volumn	Volumn
		Treatment?	Needs	Facility	(ac-ft.)	Infiltration
Volumn		Water Quality	Treatment			

Infiltrated		Treated		(ac-ft)	(ac-ft)		Credit
Permeable Pavement	POC	Y		29.86	32.81	32.81	Y
99.98	32.81	99.98		Treat. Credit			
Total Volume Infiltrated				29.86	32.81	32.81	
99.98	32.81	33 / 33 = 100%		Treat. Credit = 100%			

Compliance with LID Standard 8
Duration Analysis Result = Passed

Perlnnd and Implnd Changes

No changes have been made.

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5.3 Conveyance Analysis

NA

6.0 Appendix

A. Geotechnical Report

A. GEOTECHNICAL REPORT

Geotechnical Engineer's Report

Western Geotechnical Consultants, Inc.
4183 Saltspings Drive, Ferndale, WA 98248
Phone/FAX (360)380-2507

August 10, 2007

Monster Construction
27419 118th Street SE
Monroe, WA 98272
Attn: Shanna Clothier

Re: Stormwater Control Plan Review
13907 Chain Lake Road
Monroe, Washington

This letter provides the results of our review of the stormwater control plan for the above referenced property. We reviewed the drainage plan prepared by HBA Design Group and we also reviewed the test hole logs in our files. A total of 6 test holes were advanced on the property. The property typically contains a fine sandy silt layer beneath the topsoil that extends 2 to 3 feet below grade. Glacial till was encountered at the base of all of the test pits.

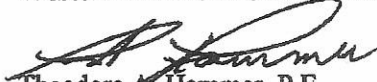
The USDA Soil Conservation Service "Soil Survey of Snohomish County Area, Washington" has mapped the site soils as Tokul gravelly loam. Tokul soils are moderately deep, moderately well drained soil located on till plains. The soils logged by Western Geotechnical Consultants, Inc. were finer grained than Tokul soils but we did log glacial till at depth.

It is our understanding that the stormwater design was based on infiltration using a short term infiltration rate of 0.5 inches per hour. This is appropriate for loam soils. The actual design used a safety factor of 4 resulting in design infiltration rate of 0.13 inches per hour, as recommended in the "Stormwater Management Manual for Western Washington, 2005 edition". The HBA Design Group design calls for porous pavement in the access road and dispersion trenches for the houses on the property. Water exits from the dispersion trenches to a mild, vegetated slope that is on the order of 6 to 9 percent. Based on our review of the design plan it is our opinion that the design is stable and sound.

We appreciate the opportunity to be of assistance to you on this project. If you have any questions regarding the contents of this report, or if we can be of further assistance, please contact our office.

Sincerely,

Western Geotechnical Consultants, Inc.


Theodore A. Hammer, P.E.
Geotechnical Engineer

cc: HBA Design Group, LLC



EXPIRES 12/27/07

File: 061482

June 15, 2006

Western Geotechnical Consultants, Inc.

4183 Salt springs Drive, Ferndale, WA 98248

Phone/FAX (360) 380-2507

Monster Construction

27419 118th Street SE

Monroe, WA 98272

Attn: Shanna Clothier

Re: Geotechnical Site Investigation

13907 Chain Lake Road

Monroe, Washington

Western Geotechnical Consultants, Inc. is pleased to present the results of our geotechnical site investigation conducted at the above referenced property. The site is presently planned to be subdivided into seven lots along with a separate drainage tract (see Site Plan, Figure 1). Two of the lots are already developed as single family lots, and we understand that the other four lots are also planned for single-family development. The purpose of our investigation was to evaluate the feasibility of using stormwater infiltration on each of the lots to eliminate the need for a Detention Tract and thus create another lot. The scope of our investigation for the site included:

- Reviewing published geologic, geotechnical and topographic information for the area;
- Traveling to the site to log and classify soils encountered in accordance with the Unified Soils Classification System (USCS);
- Sampling and testing representative soils encountered in the six test pits;
- Engineering analyses; and
- Preparation of this engineering report with our conclusions concerning the feasibility of stormwater infiltration on the proposed individual lots.

SITE CONDITIONS

Surface Conditions

The site is presently developed with two houses and appurtenant improvements on two of the lots. The remaining lots are presently unimproved but some surface modifications are evident, such as grading on one of the lots. These vacant lots generally have low-lying ground cover.

Subsurface Conditions

Subsurface conditions at the site were explored on June 8, 2006 using a track-mounted excavator. A total of six test pits were excavated as part of our exploration of the site. The locations of the test pits are shown on the attached Site Plan, Figure 1.

A geotechnical engineer from our office maintained continuous logs of the subsurface soil and ground water conditions encountered in the test pits, and soils encountered were classified using the Unified Soils Classification System (USCS). The soil types, as well as the depths where the characteristics of the soils changed, are indicated on the test pit logs.

Note that the depths indicated on the logs where conditions changed may represent gradational variations between soils types. Edited, tabulated test pit logs are included in this report along with a USCS Chart explaining soil descriptions. The test pits were loosely backfilled upon completion of the explorations. Piezometers were installed in Test Pits 1 and 2.

(Page 2 of 7)

The test pit explorations revealed that the subsurface soil conditions are uniform across the site. The general subsurface profile consists of a topsoil layer up to about one foot thick consisting of dark brown, sandy organic SILT with roots (OL by Unified Soil Classification System (USCS)). In Test Pit 2, we encountered the apparent original topsoil layer beneath about two feet fill consisting of sandy SILT to silty fine SAND (ML/SM by the USCS). Below the fill encountered in Test Pit 2 and the topsoil/root zone, we encountered similar fine sandy SILT to silty fine SAND with occasional gravel (ML/SM by USCS), which extended to the bottom of the test pits (maximum depth of 4.5 feet). At the bottom of all the test pits, these soils became very compact to hard, which we interpret to be glacially compacted soil (till).

The USDA Soil Conservation Service "Soil Survey of Snohomish County Area, Washington" has mapped the site soils as Tokul gravelly loam. Tokul soils are moderately deep, moderately well drained soil located on till plains. Tokul soils formed in glacial till and volcanic ash. The permeability of Tokul soils is moderate above the till and very slow through the till. Consequently a perched water table typically forms during the wet season.

Groundwater Conditions

Perched groundwater was encountered in Test Pit 2 above the very compact to hard and relatively impermeable glacial till soils encountered at a depth of 3.5 feet. Seepage was not observed in any of the other test pits. Piezometers were installed in Test Pits 1 and 2 for possible future monitoring of groundwater levels, if required.

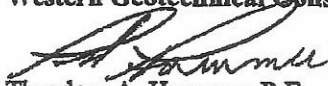
Conclusions and Recommendations

Our geotechnical engineering investigation revealed the presence of near surface silty soils over relatively impermeable glacial till soils at shallow depths in all the test pits. Consequently, we anticipate that a perched water table will develop in the winter thus not allowing for the 3 foot vertical separation required for infiltration facilities. In our opinion these soil conditions are not conducive for the effective use of stormwater infiltration at the site and we are recommending that stormwater facilities be designed using full detention.

We appreciate the opportunity to be of assistance to you on this project. If you have any questions regarding the contents of this report, or if we can be of further assistance, please contact our office.

Sincerely,

Western Geotechnical Consultants, Inc.


Theodore A. Hammer, P.E.
Geotechnical Engineer

Inclusions: Figure 1, Site Plan & Test Pit Locations
USCS Chart & Key to Test Pit Descriptions

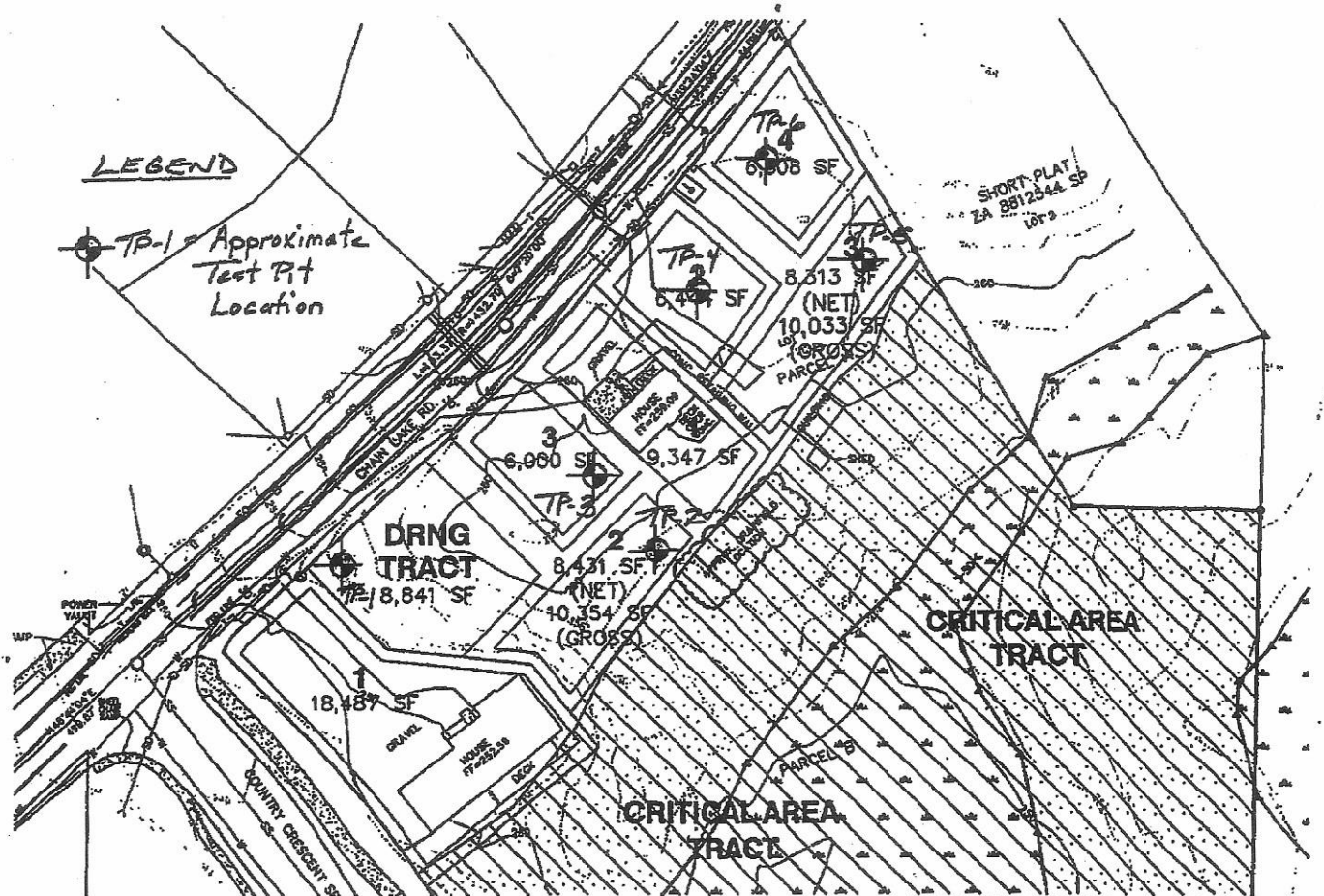
cc: Higa-Burkholder Associates, LLC



File:06 148 1

(Page 3 of 7)

Figure 1
Site Plan & Test Pit Locations
13907 Chain Lake Road
Monroe, WA



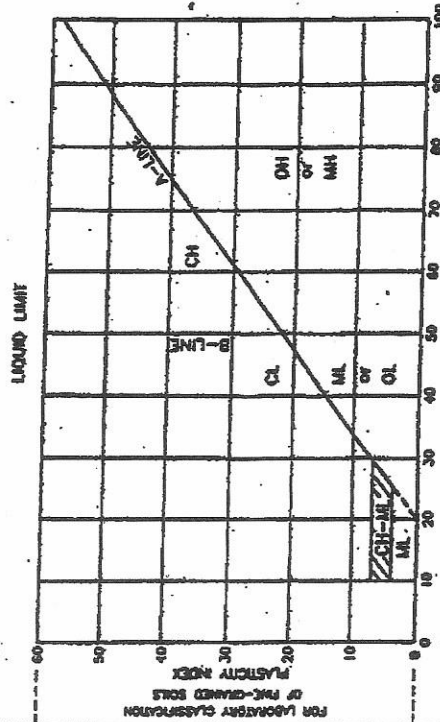
(Page 4 of 7)
USCS Chart & Key to Test Pit Descriptions

GRADATION CHART

MATERIAL SIZE	PARTICLE SIZE			
	LOWER LIMIT		UPPER LIMIT	
	MILLIMETERS	SEVE SIZE	MILLIMETERS	SEVE SIZE
SAND	.075	#200	0.425	#40
	0.425	#40	2.00	#10
	2.00	#10	4.75	#4
GRAVEL	4.75	#4	191	3/4"
	191	3/4"	762	3"
COBBLES	762	3"	304.8	12"
	304.8	12"	914.4	36"

• U.S. STANDARD • CLEAR SQUARE OPENINGS •
5-12% FINES (SILT & CLAY) DUAL CLASS

PLASTICITY CHART



UNIFIED SOIL CLASSIFICATION CHART (USCS)

MAJOR DIVISIONS		GRAPH SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (BUTLE OR NO FINES) #20	GW	WELL-SORTED GRAVEL, SAND-CLAY MIXTURE, LITTLE OR NO FINE
	MORE THAN ONE OF COARSE FRACTION EXCEEDS 5% AND NO FINE	GRAVELS WITH FINES (APPROXIMATE AMOUNT OF FINES) #20	GP	POORLY-SORTED GRAVEL, SAND-CLAY MIXTURE, LITTLE OR NO FINE
FINE GRAINED SOILS	SAND AND SANDY SOILS	CLEAN SANDS (BUTLE OR NO FINES) #40	SM	WELL-SORTED SAND, GRAVELLY SAND, LITTLE OR NO FINE
	MORE THAN ONE OF COARSE FRACTION EXCEEDS 5% AND NO FINE	SANDS WITH FINES (APPROXIMATE AMOUNT OF FINES) #40	SP	POORLY-SORTED SAND, GRAVELLY SAND, LITTLE OR NO FINE
HIGHLY ORGANIC SOILS	SILTS AND CLAYS	USING LOW LESS THAN 50	ML	MODERATE SILTS AND VERY FINE CLAYS, RICE FLAKES, SILT OR CLAY WITH SILT, SILT OR CLAY WITH SILT, SILT OR CLAY WITH SILT
	SILTS AND CLAYS	USING LOW GREATER THAN 50	CL	MODERATE SILTS AND VERY FINE CLAYS, RICE FLAKES, SILT OR CLAY WITH SILT, SILT OR CLAY WITH SILT, SILT OR CLAY WITH SILT
HIGHLY ORGANIC SOILS	SILTS AND CLAYS	USING LOW GREATER THAN 50	OL	MODERATE SILTS AND VERY FINE CLAYS, RICE FLAKES, SILT OR CLAY WITH SILT, SILT OR CLAY WITH SILT, SILT OR CLAY WITH SILT
	SILTS AND CLAYS	USING LOW GREATER THAN 50	OH	MODERATE SILTS AND VERY FINE CLAYS, RICE FLAKES, SILT OR CLAY WITH SILT, SILT OR CLAY WITH SILT, SILT OR CLAY WITH SILT

Western Geotechnical Consultants, Inc.

**4181 Salsprings Drive • Ferndale, WA 98248
Phone (360) 380-2507 • Fax (360) 380-2507**

Key-to-Test Pit Logs Using the Unified Soil Classification System

A-TEST PITS

(Page 5 of 7)

			Table A-1 Log of Test Pits		File: 06 148 1 Clothier Property	
Test Pit No.	Depth Interval (feet)	USCS Class.	Soil Description	Sample No./ Depth (feet)	Water Content (%)	Laboratory Test Performed
TP-1	0.0-1.0	OL/ML	Dark brown, organic and sandy SILT, topsoil and primary root zone (moist, soft)			
	1.0-2.5	ML/SM	Brown, fine sandy SILT with trace organics and occasional roots (very moist, relatively compact)	1-1/1.5'	32.9%	
	2.5-3.5	ML/SM	Light brown, silty fine SAND with occasional gravel (moist, compact to very compact); grades gray-brown till at 3.5 feet	1-2/3.0' 1-3/3.5'	18.3% 9.7%	

Notes:

- Test Pit terminated on 6/8/06 at 3.5 feet.
- Test Pit backfilled upon completion.
- No groundwater seepage observed.
- No sidewall caving.
- Piezometer installed full depth.

			Table A-1 Log of Test Pits		File: 06 148 1 Clothier Property	
Test Pit No.	Depth Interval (feet)	USCS Class.	Soil Description	Sample No./ Depth (feet)	Water Content (%)	Laboratory Test Performed
TP-2	0.0-2.0	ML/SM (FILL)	Brown, silty SAND (moist, relatively noncompact) (Fill)			
	2.0-2.5	OL/ML	Dark brown, organic and sandy SILT (moist, soft) (old topsoil layer)			
	2.5-3.5	ML/SM	Orange brown, fine sandy SILT with occasional gravel and some organics (very moist, relatively compact)	2-1/3.0'	49.4%	
	3.5-5.5	ML/SM	Light brown, silty fine SAND with occasional gravel (moist, compact to very compact at about 4 feet)	2-2/4.5'	25.3%	

Notes:

- Test Pit terminated on 6/8/06 at 4.5 feet.
- Test Pit backfilled upon completion.
- Groundwater seepage observed at 3.5 feet.
- No sidewall caving.
- Piezometer installed full depth.

(Page 6 of 7)

			Table A-1' Log of Test Pits		File: 06 148 1 Clothier Property	
Test Pit No.	Depth Interval (feet)	USCS Class.	Soil Description	Sample No./ Depth (feet)	Water Content (%)	Laboratory Test Performed
TP-3	0.0-0.8	OL/ML	Dark brown, organic and sandy SILT, topsoil and primary root zone (moist, soft)			
	0.8-2.0	ML/ SM	Orange brown, very fine sandy SILT (very moist, relatively noncompact)	3-1/1.5'	38.3%	
	2.0-3.5	ML/ SM	Light brown, silty fine SAND with occasional gravel (moist, compact to very compact); grades gray-brown till at 3.5 feet	3-2/2.5' 3-3/3.5'	36.9% 12.9%	

Notes:

- Test Pit terminated on 6/8/06 at 3.5 feet.
- Test Pit backfilled upon completion.
- No groundwater seepage observed.
- No sidewall caving.

			Table A-1 Log of Test Pits		File: 06 148 1 Clothier Property	
Test Pit No.	Depth Interval (feet)	USCS Class.	Soil Description	Sample No./ Depth (feet)	Water Content (%)	Laboratory Test Performed
TP-4	0.0-1.0	OL/ML	Dark brown, organic and silty SAND, topsoil and primary root zone (moist, soft)			
	1.0-2.5	ML/ SM	Orange brown, fine sandy SILT with some organics (very moist, relatively compact)	4-1/1.5'	44.6%	
	2.5-3.0	ML/ SM	Light brown, silty fine SAND with occasional gravel (moist, compact to very compact); grades gray-brown till at 3.0 feet	4-2/2.5' 4-3/3.0'	16.4% 9.4%	

Notes:

- Test Pit terminated on 6/8/06 at 3.0 feet.
- Test Pit backfilled upon completion.
- No groundwater seepage observed.
- No sidewall caving.

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			Table A-1 Log of Test Pits		File: 06 148 1 Clothier Property	
Test Pit No.	Depth Interval (feet)	USCS Class.	Soil Description	Sample No./ Depth (feet)	Water Content (%)	Laboratory Test Performed
TP-5	0.0-0.7	OL/ML	Dark brown, organic and sandy SILT, topsoil and primary root zone (moist, soft)			
	0.7-2.5	ML/SM	Orange brown, fine sandy SILT with some organics (very moist, relatively compact)	5-1/1.5'	43.9%	
	2.5	ML/SM	Light brown, silty fine SAND with occasional gravel (moist, very compact); (glacial till)	5-2/2.5'	11.9%	

Notes:

- Test Pit terminated on 6/8/06 at 2.5 feet.
- Test Pit backfilled upon completion.
- No groundwater seepage observed.
- No sidewall caving.

			Table A-1 Log of Test Pits		File: 06 148 1 Clothier Property	
Test Pit No.	Depth Interval (feet)	USCS Class.	Soil Description	Sample No./ Depth (feet)	Water Content (%)	Laboratory Test Performed
TP-6	0.0-1.0	OL/ML	Dark brown, organic and sandy SILT, topsoil and primary root zone (moist, soft)			
	1.0-2.5	ML/SM	Light brown, silty fine SAND with occasional gravel (moist, very compact); sandy glacial till from about 1.5 feet	6-1/1.0 6-2/2.5'	40.4% 10.7%	

Notes:

- Test Pit terminated on 6/8/06 at 2.5 feet.
- Test Pit backfilled upon completion.
- No groundwater seepage observed.
- No sidewall caving.